



Department of Energy  
Office of Legacy Management

DEC 19 2005

Mr. Paul Mushovic  
U.S. Environmental Protection Agency, Region 8  
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Denver, CO 80202-2466

Mr. David Bird  
Division of Environmental Response and Remediation  
State of Utah Department of Environmental Quality  
168 North 1950 West  
Salt Lake City, UT 84116

Subject: Submittal of the Addendum to Final Wetland Monitoring Report at Monticello, Utah

Dear Mr. Mushovic and Mr. Bird:

Enclosed is a copy of the *Addendum to Final Results of Wetland Restoration and Monitoring at the Monticello Mill Tailings Site and Monticello Vicinity Properties*. This report summarizes the results of DOE's qualitative monitoring of the restored wetlands that was conducted in July 2005. This monitoring was requested after receipt of the final wetland report in 2004.

Results indicate that the majority of wetlands disturbed by remediation are successfully restored and are expected to remain so over the long term. Acreage of the restored wetlands exceeds the required acreage, and the restored wetlands are typically of a higher quality than those disturbed by remediation.

If you have any questions or concerns, please contact me at (970) 248-6091 or Tom Kirkpatrick at (970) 248-6587.

Sincerely,

Raymond M. Plienness  
Director, LM-50  
Office of Land and Site Management

Enclosures

cc w/ enclosure:

M. Kastens, Stoller

L. Sheader, Stoller

cc w/o enclosure:

T. Kirkpatrick, Stoller (e)

Project File 530.02 (A) (D. Roberts)

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## **Addendum to Final Results of Wetland Restoration and Monitoring at the Monticello Mill Tailings Site and Monticello Vicinity Properties**

### **Introduction**

Formal monitoring of the restored wetland areas at the Monticello Mill Tailings Site and Monticello Vicinity Properties was completed in 2004 with the successful restoration/mitigation of all wetlands affected by remediation. Restoration efforts are summarized in a final monitoring report submitted to EPA and the State of Utah (DOE 2005). In response to an EPA request (Mushovic 2004), qualitative assessments were performed on July 26 and 27, 2005, on all wetland areas restored during the course of the remediation project. Results of these assessments are summarized in this report.

### **Methods**

Each restored wetland area was photographed and assessed for vegetation composition, obvious indicators of wetland hydrology, and other information indicating the condition of the wetland. For each area, a list of dominant, minor, and trace species was compiled. Although formal delineations were not performed, the dominant plant species were categorized according to their wetland indicator status, and this information was used to estimate the percent cover of wetland species, the most reliable indicator of wetland status in developing wetlands.

### **Results**

The results of the wetland assessments are summarized in the table in Attachment 1. Photographs are included in Attachment 2.

### **Discussion**

Wetlands located on the Monticello Millsite property reached success criteria between 2003 and 2004. In 2005, five wetland areas<sup>1</sup> appear to have expanded in size, and the remaining wetlands have remained approximately the same size. Vegetation in all the millsite wetlands is composed largely of desirable species and is lush and dense. Populations of Canada thistle and tamarisk, noted at the time of monitoring, were treated in summer 2005.

Wetlands on the hillside north of the millsite include seeps and drainages located on Properties MP-00178-RS, MS-00182-VL, MP-00845-VL, and MS-01103-VL. The nineteen wetlands on these properties reached success criteria between 1998 and 2001. In 2005, four of these wetland areas appear to have expanded<sup>2</sup>, six remained

<sup>1</sup> Montezuma Creek, Backwater Wetland #1, Backwater Wetland #2, Backwater Wetland #3, and Goodknight Spring.

<sup>2</sup> Tree Seep 1, Tree Seep 2, Cemetery Seep, and Pumphouse 1 Seep

approximately the same<sup>3</sup>, four appear to have decreased in size<sup>4</sup>, and five no longer qualify as wetland areas<sup>5</sup>. It is estimated that approximately 39,000 ft<sup>2</sup> of wetland areas now exist on these properties. Although this is a decrease since success criteria were met, it exceeds the pre-remedial value of 29,607 ft<sup>2</sup>. The most plausible explanation for the decrease in total acreage is the recent repair of a large city water line in the vicinity of some of the wetlands, which decreased their water supply. Post-remedial changes in ground water patterns and woody vegetation may also have caused increases, decreases, and boundary shifts in some areas.

Wetlands located in upper and lower Montezuma Creek reached success criteria between 1999 and 2004. Although most of the areas have remained approximately the same size, the Deposit K Wetland and the Pipeline Wetland have expanded significantly since reaching success criteria in 2004 and 2001, respectively. Vegetation in these areas is largely dominated by desirable, perennial species.

Other wetlands in the Monticello area<sup>6</sup> reached success criteria between 1999 and 2002. Most of these wetlands remain similar in size and composition, but several have shifted boundaries<sup>7</sup> or expanded<sup>8</sup> since they have been successfully restored.

Results of the 2005 assessments of Monticello wetlands indicate that the majority of the wetlands disturbed by remediation are successfully restored and are expected to remain healthy and successful over the long term. Acreage of the restored wetlands continues to exceed the required 7.5 acres, and the majority of the wetlands are of higher quality, containing a greater diversity of desirable native species, than pre-existing wetlands. DOE considers its wetland restoration program a success.

## References

DOE (U.S. Department of Energy), 2005. *Final Results of Wetland Restoration and Monitoring at the Monticello Mill Tailings Site and Monticello Vicinity Properties*, prepared by S.M. Stoller Corporation of DOE Office of Legacy Management, Grand Junction, Colorado, February.

Mushovic, P., 2004. Personal communication between Paul Mushovic, EPA Region VIII, Denver, Colorado, and Marilyn Kastens, S.M. Stoller Corporation, Grand Junction, Colorado, on December 13, 2004.

<sup>3</sup> Tree Seep 3, Woodpile Seep, Tiny Seep, Surprise #2 Seep, Pumphouse 2 Seep, and Upper North Drainage

<sup>4</sup> Upper Seep, Lower SW Seep, Surprise #1 Seep, and Ground Water Drainage 2

<sup>5</sup> Central Tract, Mule Deer Seep, Ghost House Seep, Spot Seep, and Hill Side Spring

<sup>6</sup> Located on Properties MP-00179-VL, MS-00884-VL, MS-00891-VL, MS-00971-RS, MS-01006-VL, MS-01041-VL, and MP-01042-VL

<sup>7</sup> Hill Side Seep on Property MS-00884-VL

<sup>8</sup> Western drainage of Stock Pond on Property MP-00179-VL, Hill Side Seep on Property MS-00891-VL, Edge of Pond, and Haul Road Wetland.



**Attachment 1: Status of Restored Wetlands at the Monticello Mill Tailings Site and Monticello Vicinity Properties**

Wetland Name	Date Restored <sup>9</sup>	Size <sup>10</sup>	% Wetland Species <sup>11</sup>	Comments
<i>MP-00178-RS</i>				
Central Tract	1998	7,936	-	No longer a wetland area.
Tree Seep 1	1999	463	60	Has joined with Tree Seep 2 and extended to the east, increasing by about 4,000 square feet; contains healthy, dense willows.
Tree Seep 2	1999	806	60	See Tree Seep 1.
Tree Seep 3	1999	1,004	50	Marginal wetland.
Woodpile Seep	1999	774	67	Approximately same size as in 2000.
Cemetery Seep	1999	602	67	Wetland has at least doubled in size and contains dense willows.
Upper Seep	2000	6,752	75	The northwestern corner is now disconnected from the main wetland, and it contains approximately 50% wetland species.
Lower SW Seep	2001	554	25	Very small area along fence may be marginal wetland; remainder is upland.
Mule Deer Seep	2001	166	-	No longer a wetland area.
Tiny Seep	2000	1,157	67	Approximately same size as in 2000.
Surprise #1 Seep	2000	28	50	Smaller and dryer than in 2000.
Surprise #2 Seep	2000	933	75	Saturated soils; approximately same size as in 2000.
Ghost House Seep	2000	451	-	No longer a wetland area; a few scattered willows remain.
Spot Seep	2000	130	-	No longer a wetland area.
<i>MP-00179-VL</i>				
Stock Pond	1999	20,862	75-100	Western drainage wetland area has expanded (80% wetland species); northern drainage approximately same size as in 1999 (100% wetland species); pond is highly disturbed (75% wetland species).
Phase III Mont. Creek	2001	22,473	100	Approximately same size as in 2001.
Phase IV Mont. Creek	2001	10,349	100	Approximately same size as in 2001.

<sup>9</sup> The year that success criteria were met. Some wetlands were restored in situ, some were created, and some formed naturally. Details are provided in the 2004 monitoring report (DOE 2005).

<sup>10</sup> Size is given in square feet and reflects the size of the wetland at the time of successful restoration.

<sup>11</sup> Estimate based on ocular assessment of the top one to five dominant plant species. A value of greater than 50% indicates that the area likely meets the criteria for a wetland.

**Attachment 1: Status of Restored Wetlands at the Monticello Mill Tailings Site and Monticello Vicinity Properties**

Wetland Name	Date Restored <sup>9</sup>	Size <sup>10</sup>	% Wetland Species <sup>11</sup>	Comments
<i>MS-00182-VL</i>				
Hill Side Spring	2001	109		No longer a wetland area.
<i>MP-00845-VL</i>				
Pumphouse 1 Seep	2001	93	67	This area has become 6-8 scattered wetlands with a larger total area than in 2001.
Pumphouse 2 Seep	2001	3,354	100	Wetland border is moving to the east; west end is drying slightly.
Upper North Drainage	2001	18,291	100	Inundated and saturated in places.
<i>MS-00884-VL</i>				
Hill Side Seep	1999	6,385	80	Western portion no longer a wetland. Eastern portion has expanded beyond the fence in places.
<i>MS-00891-VL</i>				
Hill Side Seep	2000	7,929	100	Wetland has expanded uphill well past the area delineated in 2000.
<i>MS-00971-RS</i>				
Draw	1999	7,624	100	Wetland grasses comprise dominant vegetation.
<i>MS-01006-VL</i>				
Below Pond	1999	11,116	100	Wetland species composition changes from upper to lower areas; very dense.
<i>MS-01041-VL</i>				
Edge of Pond	2001	815	67	Wetland area may be expanding slightly.
<i>MP-01042-VL</i>				
Haul Road Wetland	1999	470	100	Wetland is in very good condition and may be larger than in 1999.
North Draw	-	-	80	Most of this area may be wetland, but likely does not meet cover success criteria.
South Depression/Pond	2002	4,151	100	Approximately same size as in 2002.
<i>MS-01103-VL</i>				
Ground Water Drainage 2	2000	1,744	67	Wetland is only 1/3 of size as in 2000; may be due to water line repairs in area.
<i>Upper Montezuma Creek</i>				
Deposit K Wetland	2004	321	75	Entire remediated area (larger than the area delineated in 2004) now contains wetland vegetation, but species composition changes closer to creek. Evidence of landowner's use of chemical herbicide.
Pipeline Wetland	2001	13,152	80	Wetland area has expanded significantly and contains a diversity of species.

**Attachment 1: Status of Restored Wetlands at the Monticello Mill Tailings Site and Monticello Vicinity Properties**

Wetland Name	Date Restored <sup>9</sup>	Size <sup>10</sup>	% Wetland Species <sup>11</sup>	Comments
Deposit CC Wetland	2001	7,812	80	Approximately the same size as in 2001.
Deposit DD Wetland	2001	81	100	Approximately the same size as in 2001.
<i>Lower Montezuma Creek</i>				
Hot Spot D	1999	31	50	Vegetation indistinguishable from surrounding vegetation; marginal wetland, but showed evidence of recent inundation.
<i>Monticello Millsite</i>				
Montezuma Creek	2003	60,397	80	Washed-out area that was revegetated in 2004 (and not included in wetland acreage) now likely qualifies as wetland.
Backwater Wetland #1	2004	43,070	100	Wetland has expanded since 2004; very lush and dense vegetation.
Backwater Wetland #2	2003	74,373	100	Wetland has expanded since 2004; very lush and dense vegetation.
Backwater Wetland #3	2004	64,924	100	Desirable wetland plants continued to expand and become denser since 2004.
Seep Pond	2004	1,498	100	Approximately same size as in 2004.
Well T01-27 Seep	2003	1,115	100	Approximately same size as in 2003; dense shrubby and emergent vegetation.
Well T01-28 Seep	2003	2,523	100	Approximately same size as in 2003; very diverse wetland species.
Highway Seep	2003	1,900	100	Approximately same size as in 2003; Canada thistle present in wetland (treated in 2005).
Goodknight Spring	2003	6,861	75	Area may be expanding as willows spread and mature; Canada thistle present (treated in 2005).
Hillside East Seep	2003	3,262	100	Approximately same size as in 2003; dense vegetation and inundated soils.
Hillside Far East Seep #2	2003	80	50	Approximately same size as in 2003; would likely qualify as wetland based on minor species. Two upland dominant species are annual weeds.
Seep #3 Drainage Way	2003	2,370	100	Approximately same size as in 2003; dense vegetation.

**Attachment 2: Photographs of Restored Wetlands at the Monticello Mill Tailings Site and Monticello Vicinity Properties**

<b>Photograph Number</b>	<b>Wetland Name</b>	<b>Description</b>
1	MP-00178-RS – Tree Seep 1	View north, original portion of Tree Seep 1
2	MP-00178-RS – Tree Seeps 1 & 2	View northeast, including expanded area
3	MP-00178-RS – Tree Seep 3	View west
4	MP-00178-RS – Woodpile Seep	View east
5	MP-00178-RS – Cemetery Seep	View southeast
6	MP-00178-RS – Upper Seep	Northwest corner of wetland, view east-northeast
7	MP-00178-RS – Upper Seep	Main wetland, view east
8	MP-00178-RS – Lower Southwest Seep	View southwest
9	MP-00178-RS – Tiny Seep	View northeast
10	MP-00178-RS – Surprise #1 Seep	View northwest
11	MP-00178-RS – Surprise #2 Seep	View west
12	MP-00179-VL – Stock Pond	Northern drainage, view south
13	MP-00179-VL – Stock Pond	Southern edge of pond, view west
14	MP-00179-VL – Stock Pond	Western drainage, view southeast
15	MP-00179-VL – Phase III Montezuma Creek	View east from the culvert crossing
16	MP-00179-VL – Phase IV Montezuma Creek	Eastern end, view west
17	MP-00845-VL – Pumphouse 1 Seep	View uphill of original seep area
18	MP-00845-VL – Pumphouse 2 Seep	Eastern portion of seep
19	MP-00845-VL – Upper North Drainage	Wetland and pond, view south
20	MP-00845-VL – Upper North Drainage	View downstream from middle
21	MS-00884-VL – Hill Side Seep	Eastern portion, view west
22	MS-00891-VL – Hill Side Seep	View east
23	MS-00971-RS – Draw	View west-northwest, near the western end of wetland
24	MS-01006-VL – Below Pond	View south
25	MS-01041-VL – Edge of Pond	View west-northwest
26	MP-01042-VL – Haul Road Wetland	View south

**Attachment 2: Photographs of Restored Wetlands at the Monticello Mill Tailings Site and Monticello Vicinity Properties**

27	MP-01042-VL – North Draw	View east, downstream
28	MP-01042-VL – South Depression/Pond	View south-southeast
29	MS-01103-VL – Ground Water Drainage 2	View south
30	Upper Montezuma Creek – Deposit K	View south
31	Upper Montezuma Creek – Pipeline Wetland	Pipeline crossing, view south
32	Upper Montezuma Creek – Deposit CC	View northwest from irrigation stop gate
33	Upper Montezuma Creek – Deposit DD	View west
34	Lower Montezuma Creek – Hot Spot D	View east
35	Monticello Millsite – Montezuma Creek	View upstream from the eastern bridge
36	Monticello Millsite – Montezuma Creek	Downstream from outlet of Backwater Wetland #1, view northeast
37	Monticello Millsite – Montezuma Creek	New wetland area, view east from footbridge
38	Monticello Millsite – Backwater Wetland #1	View east from the road
39	Monticello Millsite – Backwater Wetland #2	View southeast from access road
40	Monticello Millsite – Backwater Wetland #3	View east-southeast
41	Monticello Millsite – Seep Pond	View east-northeast
42	Monticello Millsite – T-01-27 Seep	View south
43	Monticello Millsite – T-01-28 Seep	View east
44	Monticello Millsite – Highway Seep	View southeast, downslope
45	Monticello Millsite – Goodknight Spring	Main drainage area, view north
46	Monticello Millsite – Hillside East Seep	View west-northwest
47	Monticello Millsite – Hillside Far East Seep	View southwest
48	Monticello Millsite – Seep #3 Drainage Way	View southwest



**Property MP-00178-RS:**



Photo 1 – View north, original portion of Tree Seep 1



Photo 3 – Tree Seep 3, view west



Photo 2 – Tree Seeps 1 & 2, view northeast, including expanded area



Photo 4 – Woodpile Seep, view east



**Property MP-00178-RS:**



Photo 5 – Cemetery Seep, view southeast



Photo 7 – Upper Seep, main wetland, view east



Photo 6 – Upper Seep, northwest corner of wetland, view ENE



Photo 8 – Lower Southwest Seep, view southwest



**Property MP-00178-RS:**



Photo 9 – Tiny Seep, view northeast

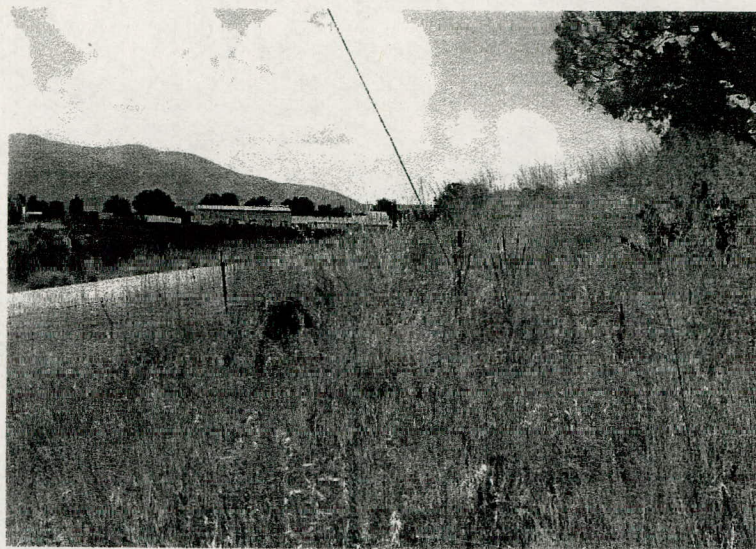


Photo 11 – Surprise #2 Seep, view west

**Property MP-00179-VL:**



Photo 10 – Surprise #1 Seep, view northwest



Photo 12 – Stock Pond, northern drainage, view south



Property MP-00179-VL:



Photo 13 – Stock Pond, southern edge of pond, view west

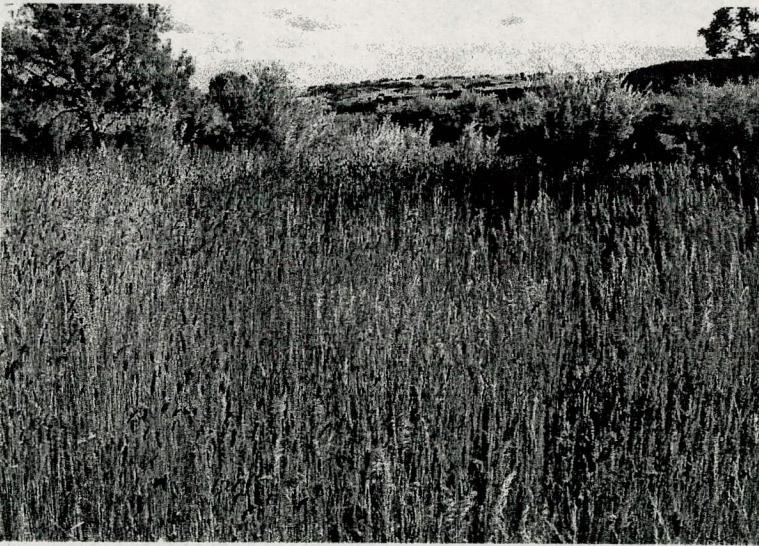


Photo 14 – Stock Pond, western drainage, view southeast



Photo 15 – Phase III Montezuma Creek, view east from culvert crossing



Photo 16 – Phase IV Montezuma Creek, eastern end, view west



Property MP-00845-VL:



Photo 17 – Pumphouse 1 Seep, view uphill of original seep area



Photo 18 – Pumphouse 2 Seep, eastern portion of seep

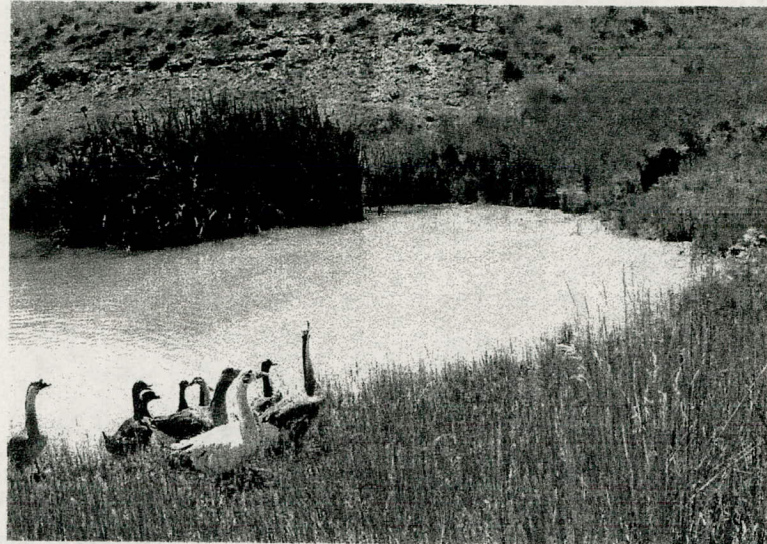


Photo 19 – Upper North Drainage, wetland and pond, view south



Photo 20 – Upper North Drainage, view downstream from middle



**Property MS-00884-VL:**



Photo 21 – Hill Side Seep, eastern portion, view west

**Property MS-00891-VL:**

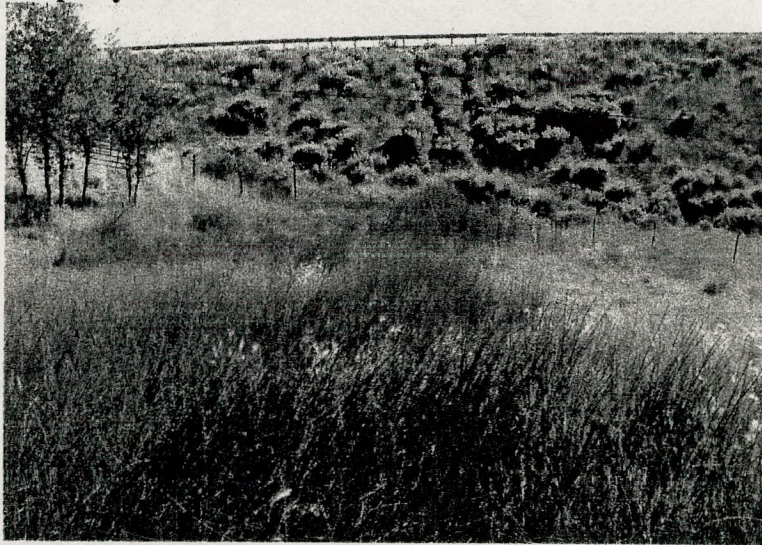


Photo 22 – Hill Side Seep, view east

**Property MS-00971-RS:**



Photo 23 – Draw, view west-northwest, near western end of wetland

**Property MS-01006-VL:**



Photo 24 – Below Pond, view south



**Property MS-01041-VL:**

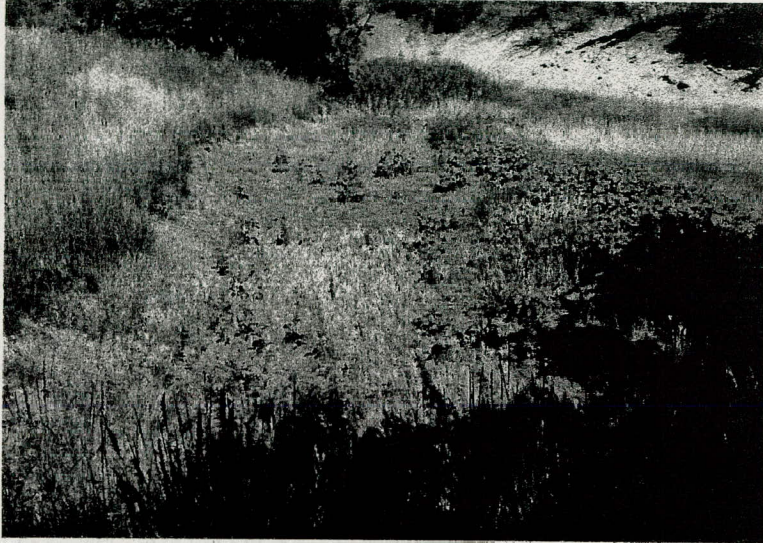


Photo 25 – Edge of Pond, view west-northwest

**Property MP-01042-VL:**



Photo 26 – Haul Road Wetland, view south

**Property MP-01042-VL:**

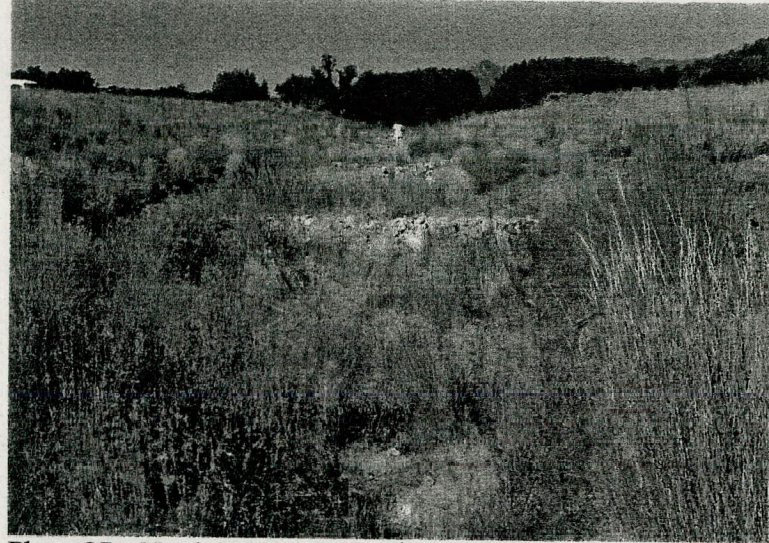


Photo 27 – North Draw, view east, downstream



Photo 28 – South Depression/Pond, view south-southeast



**Property MS-01103-VL:**



Photo 29 – Ground Water Drainage 2, view south

**Upper Montezuma Creek:**



Photo 30 – Deposit K, view south

**Upper Montezuma Creek:**



Photo 31 – Pipeline Wetland, pipeline crossing, view south



Photo 32 – Deposit CC, view northwest from irrigation stop gate



**Upper Montezuma Creek:**



Photo 33 – Deposit DD, view west

**Monticello Millsite:**



Photo 35 – Montezuma Creek, view upstream from eastern bridge

**Lower Montezuma Creek:**

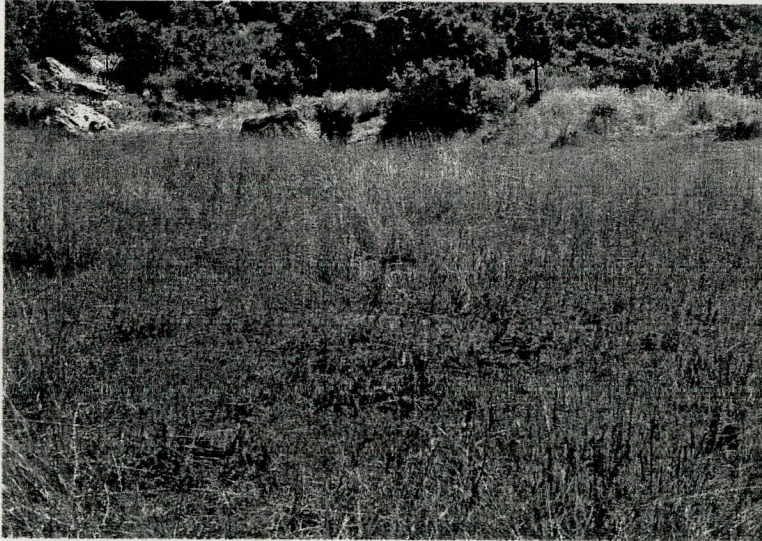


Photo 34 – Hot Spot D, view east



Photo 36 – Montezuma Creek, downstream from outlet of Backwater Wetland #1, view northeast



**Monticello Millsite:**



Photo 37 – Montezuma Creek, new wetland area, view east from footbridge



Photo 39 – Backwater Wetland #2, view southeast from access road



Photo 38 – Backwater Wetland #1, view east from the road



Photo 40 – Backwater Wetland #3, view east-southeast



**Monticello Millsite:**



Photo 41 – Seep Pond, view east-northeast



Photo 43 – T-01-28 Seep, view east



Photo 42 – T-01-27 Seep, view south



Photo 44 – Highway Seep, view southeast, downslope



**Monticello Millsite:**



Photo 45 – Goodknight Spring, main drainage area, view north



Photo 47 – Hillside Far East Seep, view southwest



Photo 46 – Hillside East Seep, view west-northwest

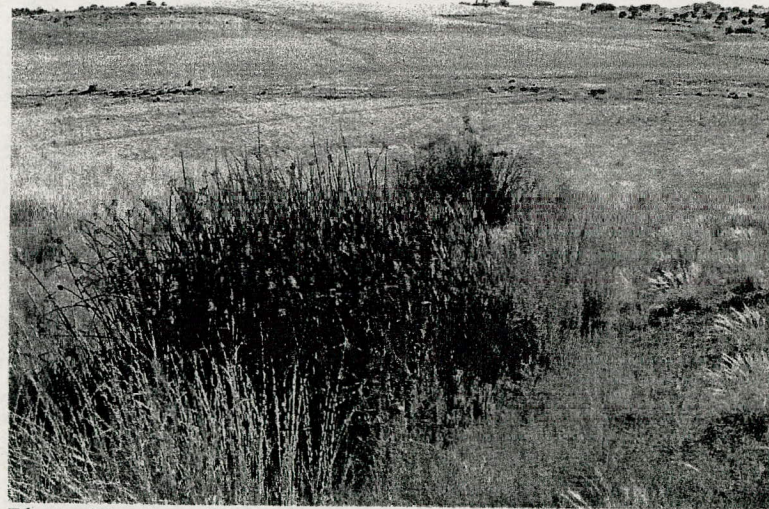


Photo 48 – Seep #3 Drainage Way, view southwest